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Public Service

Using GMRS and FRS for Emergency Communications

After losing his home to the Tubbs Fire in Northern California, Bob Dozor, K3FUL, was recruited by the Sebastopol Neighborhood Communications Unit (SNCU) in 2017 for emergency communications work. In this month's column, he talks about how Sonoma County has developed robust networks of Family Radio Service (FRS) and General Mobile Radio Service (GMRS) radios for citizens to communicate with hams who participate with Emergency Operations Centers (EOCs).

Northern California, beset by extreme drought, has been burning. Sonoma County is 1,768 square miles, and since 2017, has experienced 3 consecutive years of summer fires and evacuations. 2021 was better, but severe drought persisted in 2022.

Each summer, local fire departments, the California Department of Forestry and Fire Protection, and local government emergency services management teams have been proactively and responsively improving our collective preparedness. Last year, Sonoma County Radio Amateurs (SCRA) established the Neighborhood Communications Committee as a forum for ham radio operators to work together with their neighbors. The contributions of the Sonoma County Transportation and Public Works, or TPW (now known as Sonoma Public Infrastructure), as well as Sonoma County's Department of Emergency Management and Auxiliary Communications Service (ACS), have fueled the growth of FRS, GMRS, and local ham networks.

Understanding FRS and GMRS

Use of FRS and GMRS for neighborhood communication was proposed by the Community Emergency Response Team (CERT). CERT was developed and implemented by the Los Angeles Fire Department in 1985, and has been active in Sonoma County for more than 10 years. CERT hams have been advancing the use of FRS and GMRS in the county since then. A number of other neighborhood preparedness groups are adopting the idea and implementing it throughout the county by providing walkie-talkie classes and convening walkie-talkie networks.

FRS is the foundation of the neighborhood communication model because it's inexpensive, with radios costing as little as $12 each (and there's no license fee). FRS is limited to 2 W and poorly performing rubber duck antennas. Their restricted performance limits interference, making them an asset, and they're sufficient for many neighborhoods.

The spectrum for FRS and GMRS is 462 – 467 MHz or 65 centimeters. FM is the only mode allowed by the FCC. Hams who are familiar with UHF operation will be comfortable using a GMRS handheld with duplex capability, which behaves just like a UHF handheld transceiver.

FRS radios don't support repeater functionality, while GMRS radios have eight additional duplex repeater channels. GMRS is allowed up to 50 W on channels 15 – 22, as well as the eight duplex channels. It's limited to 5 W on lower-power channels, such as 1 – 7, and 0.5 W on chan-

Table 1 — GMRS Repeaters in Sonoma County (as of February 2023)

Area	Repeater	Tag	RX Freq.	TX Freq.	TX CTSS	RX CTSS	Channel	Online
Coastal Hills	Fort Ross	FR RPT	462.575	467.575	173.8	192.8	16	Yes
Coastal Hills	Timber Cove	TC RPT	462.575	467.575	167.9	192.8	16	Yes
Coastal Hills	Muniz	MZ RPT	462.575	467.575	162.2	192.8	16	Yes
Cazadero	Wildwood	WW RPT	462.600	467.600	173.8	192.8	17	Yes
Cazadero	Mohrhardt	MH RPT	462.600	467.600	167.9	192.8	17	Yes
Cazadero	Teravana	TV RPT	462.600	467.600	162.2	192.8	17	No
Cazadero	Sheridan	SHERID	462.600	467.600	156.7	192.8	17	Yes
Lower Russian River	Overlook	OL RPT	462.625	467.625	173.8	192.8	18	Yes
Lower Russian River	Siri	SI RPT	462.625	467.625	167.9	192.8	18	No
Lower Russian River	Mt. Jackson	MTJKSN	462.625	467.625	162.2	192.8	18	No
Occidental	Fitz Joy	FJ RPT	462.650	467.650	173.8	192.8	19	Yes
North County	Shellenger	SH RPT	462.700	467.700	173.8	192.8	21	Yes
North County	Ida Clayton	SIC RPT	462.700	467.700	167.9	192.8	21	No
North County	Hilltop	FITCH	462.700	467.700	162.2	192.8	21	Yes
East County	Los Alamos	ALAMOS	462.725	467.725	156.7	192.8	22	Yes
W SR	SIMPLEX (delay)		462.725		No tone	No tone	22	Yes

nels 8 – 14. GMRS handhelds cost $30 – $175 and typically run 5 W, and one can (and should) put improved antennas on them. GMRS mobile radios cost $125 – $350. Higher-power portable and mobile radios often don't include 0.5 W channels 1 – 7. GMRS doesn't require an exam for a license; however, a family license costs $35 (as of April 2022) and lasts 10 years.

Cost matters when trying to implement a community-wide alternative to cell phones. Significant topographic and demographic diversity drives decisions regarding the use of FRS or GMRS in each neighborhood.

Field Use

The SNCU divided its town into four quadrants and found usable FRS communication in each zone. In all four zones, SNCU established a hub with an assigned GMRS operator (communicating with FRS neighbors' walkie-talkies), a ham (communicating with the EOC), a scribe, and a CERT leader. The Incident Commander at the EOC also communicates with these hubs. EOC messages include announcements about evacuations and directions to CERT volunteers. Messages from the hubs include requests for emergency vehicles and other urgent needs in the community.

Currently, there are at least 16 GMRS repeaters functioning in Sonoma County (see Table 1). One of the most recently activated repeaters is at a tower located at an elevation of 1,983 feet. It was installed as a joint production between TPW, Northern Sonoma County CERT, and the Asti-Cloverdale Citizens Organized to Prepare for Emergencies. More GMRS projects are in the works.

Necessary Adjustments

SNCU originally used FRS radios at their hubs, but with further testing, have migrated to GMRS radios in simplex mode (no repeaters serve Sebastopol yet). With better antennas and higher power, the quality of communication to and from the hubs improved significantly, but at a greater cost. FRS and GMRS use the same frequencies and are interoperable on the 22 simplex channels.

The hub model described for Sebastopol doesn't work in topographically challenging areas of the county, where mountains and peaks over 2,000 feet are common. The Coastal Hills Radio Group operates with GMRS and ham radio; they have five GMRS repeaters, along with many ham radio operators and two robust amateur radio repeaters. They hold a weekly GMRS net, where more than 60 people check in.

A Plan for the Future

Our work is still cut out for us to extend and protect what has been established. SCRA's Neighborhood Communications Committee is at the forefront of this effort. Currently, there are 53 committee members, 30 hams, and 23 community members, including prominent local government officials, community leaders, and neighbors. Training people to effectively use walkie-talkies is our top priority. The committee is also intently focused on dealing with radio interference, particularly of the high repeaters. Ongoing field testing is important, as exponentially more radios are being put in place. Some neighborhoods will need to employ privacy tones. Agreements regarding repeater channels, especially high repeaters in neighboring counties, are in progress.

Field Organization Reports

July 2023

Public Service Honor Roll

This listing recognizes radio amateurs whose public service performance during the month indicated 70 or more points in six categories. Details on the program can be found at **www.arrl.org/public-service-honor-roll**.

465
N9VC

455
WA3EZN

430
AD8CM

412
KE8BYC

360
KE4ANW

347
W7PAT

335
WØPZD

275
N5MKY

270
ND8W

260
KD8UUB

255
W7EES

230
KK4PUX

210
WM5N

209
W9EEU

200
N2LC

190
KD8ZCM

175
WB8YYS

170
WO2H

167
W4CAC

165
KO4KUS

164
KB5PGY

160
W4CMH
AC8NP
W4DNA

158
KD2QAR

155
KV8Z

150
KC9FXE
N4CNX

149
WM2C

146
W5WMC

145
KO4OL
N8SY
N1ILZ

140
WB9WKO
W2PAX
KY2MMM
KØRCJ
WB9QPM

138
KB3YRU

134
KB8RCR

130
AG9G
K9LGU
N2JBA
K4IWW
WK4WC
KW1U

129
N2DW

125
KT5EM

123
K8MDA

120
WA4VGZ
KY2D
WA1URS
WC4FSU
K3JL
W2AH
KA9QWC

119
WW3S

117
W3YVQ

116
KR4PI

112
KD2LPM

111
KC3MAL
WD8USA

110
AD4DO
KM4WHO
KDØHHN
NW3X
KC8WH
KE4RS
KB2QO
K1UAF
N1IQI
WZØC
W1RVY
KA9MZJ

109
KC8T

105
N3GE

102
K5OB

100
NX9K
W1KX
KZ8Q
WB4RJW

AC8RV
KL7RF
KB8GUN
KB8PGW
K8ED
K3YAK
KA2HZP
K3FAZ
K1CFI
N1LAH
KC1HHO

98
KT4WX
W1INC

97
KB3MXK
KC8YVF
WV5Q

95
K1HEJ

94
W2ARP

93
N1PZP

92
N3KRX
KB1NMO

91
WB2VUF

90
KC9UC
KT5SR
KF7GC
WA3QPX
W8GSR
K8KRA
N8MRS
WX2DX
W4EDN
W4KX
KC1KVY
AB9ZA

89
KB1TCE
W9GRG

88
KG5AOP
WB8R

85
WB8SIQ
WB3FTQ

84
WB4ZDU
KB9GO
WA1LPM

83
AJ7B
AA3N
W4TTO

82
K4NWX
KA2GQQ

80
KR4ST
KB4OLY

78
W4NHO
N2TSO
N3RB
W5XX
W9BGI

77
KA9IKK
K3EAM
K2MTG

75
WB8RGE
K4FHR
W7MIN

74
N3RPB
KE8DON
K8RDN

73
W8IM

71
W2OOD
K1XFC
KBØDTI

70
K6RAU

The following stations qualified for PSHR in previous months, but were not acknowledged in this column yet: (June) KK4PUX 230, AI9F 145, WB9QPM 140, W4CAC 118, KA9MZJ 110, N3SW 90. (May) KK4PUX 215, W4CAC, AI9F 150, WB9QPM 140, KA9MZJ 110, KC3MAL 97, N3SW 90.

Section Traffic Manager Reports

The following Section Traffic Managers reported: AR, AZ, CT, DE, EMA, ENY, EPA, GA, IL, IN, KS, KY, LA, MDC, ME, MI, MO, MS, NC, ND, NE, NFL, NH, NLI, NNJ, NNY, OH, OR, RI, SD, SFL, SJV, SNJ, STX, TN, VA, WCF, WI, WMA, WPA, WWA, WY.

Section Emergency Coordinator Reports

The following Section Emergency Coordinators reported: AR, CT, ENY, EPA, EWA, GA, ID, IN, MDC, MI, MO, MS, ND, NFL, NLI, NNJ, NV, PAC, SDG, SNJ, STX, VA, VI, WCF, WMA, WPA, WTX.

Brass Pounders League

The BPL is open to all amateurs in the US, Canada, and US possessions who report to their SMs a total of 500 or more points or a sum of 100 or more origination and delivery points for any calendar month. Messages must be handled on amateur radio frequencies within 48 hours of receipt in standard ARRL radiogram format. Call signs of qualifiers and their monthly BPL total points follow.

NX9K 1,593, KY2D 1,067, W2AH 885, WB9WKO 860.

W2AH qualified for BPL in these previous months, but was not acknowledged in this column yet. (June) 1,087. (May) 1,013. (Apr.) 1,215. (Mar.) 1,388. (Feb.) 1,397. (Jan.) 1,293. (Dec. 2022) 1,208. (Nov.) 962. (Oct.) 1,291. (Sept.) 569.